Public Service of New Hampshire

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780 North Commercial Street, Manchester, NH 03101

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The Northeast Utilities System

June 6, 2007

Mr. Robert R. Scott, Director
Air Resources Division
NH Dept. of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Public Service Company of New Hampshire
Merrimack Station, Clean Air Project
Temporary Permit Application for FGD System Installation

Dear Mr. Scott,

Public Service Company of New Hampshire (PSNH) submits the enclosed application for a temporary permit for the construction of a new wet, limestone-based flue gas desulfurization (FGD) system at Merrimack Station. The project, known as the Clean Air Project, is the latest initiative in a long list of emission reduction projects undertaken by PSNH at Merrimack Station in the past two decades. Since 1989, PSNH has invested more than $50 million in capital costs at Merrimack Station in order to reduce air emissions. The Clean Air Project is the largest single capital investment and the largest single emission reduction project in the history of Merrimack Station.

PSNH's Clean Air Project involves the construction of a new FGD system including a scrubber island, a limestone material handling system, a new chimney, and additional support systems and infrastructure, as well as necessary site work required to complete the installation. The project also includes changes to the exhaust configuration of Unit #1 to allow for the operation of Unit #1 during planned annual maintenance overhauls on Unit #2 and the FGD system which will occur simultaneously.

The Clean Air Project is a multi-year, multi-component project with start-up and commissioning of the new FGD system expected to occur in 2013. The installation of a scrubber at Merrimack Station will result in significant reductions in mercury emissions and sulfur dioxide from Merrimack Unit #1 and Unit #2 – greater than an 80% reduction in mercury and greater than 90% reduction in sulfur dioxide emissions. This project will enable PSNH to achieve the 80% reduction in annual mercury emissions required by RSA 125-O:13, II from its coal fired generating stations beginning in July 2013.

The preliminary project schedule includes the following project milestones and anticipated target dates:

Preliminary Engineering	January – December 2006
Solicitation of Bids for Program Manager	April – August 2007
Award Program Manager Contract	September 2007
Develop Final Project Specifications	August 2007 – August 2008
Solicitation of Bids for FGD and Chimney	November 2007 – February 2008
Award FGD and Chimney Contract(s)	April 2008

Solicitation of Bids for Material Handling	July – September 2008
Award Material Handling Contract	September 2008
Completion of Construction	December 2012
Start-up, Commissioning, and Performance Testing	January – June 2013

I expect that a more definitive schedule will be developed by mid-2008 after the various contracts are awarded. Updates to the schedule will be provided to DES as necessary during the completion of the Clean Air Project.

Given the significant emission reductions that will be achieved as a result of the installation of the scrubber, the project is not a major modification and, therefore, not subject to Prevention of Significant Deterioration. However, as a modification to an existing stationary source, the Clean Air Project requires a temporary permit under Env-A 607.01. As required by the New Hampshire Rules Governing Air Pollution, the enclosed permit application contains an ARD-1 form, and two ARD-2 forms. PSNH has retained TRC to conduct air pollution dispersion modeling impact analysis in accordance with 40 CFR 51, Appendix W in order to evaluate two distinct operational scenarios, (1) the operation of Unit #1 and Unit #2 employing the new FGD system and chimney and (2) the operation of Unit #1 employing the existing Unit #2 stack during planned annual maintenance overhauls of Unit #2 and the FGD system. The results of this air dispersion modeling analysis will be submitted following more detailed discussions with your staff and completion of the analysis.

The enclosed application for a temporary permit satisfies the requirement contained in RSA 125-O:13, I which requires PSNH make appropriate filings with the department within one year of the effective date of RSA 125-O:13. As discussed with representatives of DES ARD's Stationary Source Management Permitting Bureau, PSNH has completed the enclosed application forms and initiated air dispersion modeling using preliminary project design specifications and equipment information. As agreed, PSNH will update this permit application and air pollution dispersion modeling, as necessary, as the Clean Air Project progresses and final design specifications and equipment information become available.

Please contact me at 634-2851 or Laurel L. Brown, Senior Environmental Analyst – Generation at 634-2331, if you would like additional information relative to the Clean Air Project or the enclosed permit application.

Sincerely,

William H. Smagula

William H. Smagula, P.E.
Director – Generation

Enclosure

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division
P.O. Box 95
Concord, NH 03302-0095
Telephone: 603-271-1370

Form ARD-1

General Information for All Permit Applications

I. FACILITY INFORMATION - *Complete the following*:

A. Type of Application: ☐ New ☐ Renewal ☒ Modification – Installation of Scrubber

B. Physical Location:

PSNH Merrimack Station
Facility Name

97 River Road
Street

Bow NH 03304
Town/City State Zip Code

C. Mailing Address:

97 River Road
Street/P.O. Box

Bow NH 03304
Town/City State Zip Code

603.224.4081
Telephone Number

D. USGS Coordinates:

UTM		or	Latitude/Longitude			
Easting:	299.17		N Latitude:	Deg 43	Min 08	Sec 28
Northing:	4779.31		W Longitude:	Deg 71	Min 28	Sec 09

E. Owner:

Public Service Company of NH
Company

780 North Commercial Street
Street/P.O. Box

Manchester NH 03101
Town/City: State Zip Code

603.669.4000
Telephone Number

F. Parent Corporation:

Northeast Utilities
Company

PO Box 270
Street/P.O. Box

Hartford CT 06141
Town/City: State Zip Code

860.665.5000
Telephone Number

G. Contact Information

1. General/Technical Contact:

Richard R. Roy
Contact Person

Engineer – Merrimack Station
Title

97 River Road
Address

Bow NH 03304
Town/City State Zip Code

224-4081 xt.247
Telephone Number

royrr@nu.com
E-mail Address

2. Application Preparation:

Public Service Company of NH
Company

Laurel L. Brown
Contact Person

780 North Commercial Street
Address

Manchester NH 03101
Town/City State Zip Code

603.634.2331
Telephone Number

brownll@nu.com
E-mail Address

Form ARD-1

3. Legal Contact:

Linda T. Landis
Contact Person

Senior Counsel
Title

780 North Commercial Street
Address

Manchester NH 03101
Town/City State Zip Code

603.634.2700
Telephone Number

landilt@nu.com
E-mail Address

4. Invoicing Contact:

Laurel L. Brown
Contact Person

Senior Environmental Analyst
Title

780 North Commercial Street
Address

Manchester NH 03101
Town/City State Zip Code

603.634.2331
Telephone Number

brownll@nu.com
E-mail Address

H. Major Activity or Product Descriptions - *List all activities performed at this facility and provide SIC code(s):*

Description of Activity or Product	SIC Code
Energy conversion facility producing electricity	4911

I. Other Sources or Devices - *List sources or devices at the facility (other than those that are the subject of this application) that are permitted pursuant to Env-A 600:*

Source or Device	Permit #	Expiration Date[1]
Electric Generating Unit #1	FP-T-0054	12/31/01
Electric Generating Unit #2	TP-B-0462	1/31/01
Combustion Turbine #1	PO-B-34	6/30/03
Combustion Turbine #2	PO-B-35	6/30/03
Emergency Generator	PO-B-1788	4/30/03
Emergency Boiler	TP-B-0490	9/30/04
Coal Crusher	PO-B-2416	4/30/03
Secondary Coal Crusher	PO-B-2417	4/30/03

II. Total Facility Emissions Data[2]:

Pollutant	CAS Number	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	149.40	1,150.14	616.60	5,042.90
SO_2	N/A	8,980.76	25,885.80	33,767.62	113,249.00
NOx	N/A	1,219.65	3,012.92	5,0133.56	10,746.50
CO	N/A	74.33	126.38	306.76	638.79
VOC	N/A	16.34	31.30	67.42	161.51

Note: For Regulated Toxic Air Pollutants list name and Chemical Abstract Service Number (CAS #).

[1] Application Shield is in effect.

[2] Actual emissions calculated using calendar year 2006 emissions and hours of operation as reported April 15, 2007. Potential emissions calculated using maximum operational and emissions limitations contained in current permits issued by NH DES ARD. See attached calculations.

Form ARD-1

III. Support Data[3] *The following data must be submitted with this application:*

- ☒ A copy of all calculations used in determining emissions;
- ☐ A copy of a USGS map section with the site location clearly indicated; and
- ☐ A to-scale site plan of the facility showing:
  1. the locations of all emission points;
  2. the dimensions of all buildings, including roof heights; and
  3. the facility's property boundary.

IV. Certification (To be completed by a responsible official only):

I am authorized to make this submission on behalf of the affected source or affected units for which this submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the information submitted in this document and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

I certify that Public Service Company of New Hampshire is the owner of the real property located at 97 River Road, Bow, New Hampshire, and that PSNH has the legal right to use said property for the construction and/or operation of a new FGD system at Merrimack Station.

Print/Type Name: John M. MacDonald Title: Vice President Energy Delivery & Generation

Signed: John M. MacDonald Date: June 7, 2007

[3] A copy of a USGS map and to-scale site plan will be included in the results of the air pollution dispersion modeling impact analysis.

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Unit #1 – Steam Electric Boiler
Date Construction Commenced: _____ **Device Start-Up Date:** 1960

A. Boiler ☐ Not Applicable

Babcock & Wilcox — Boiler Manufacturer
RB-337 — Boiler Model Number
N/A — Boiler Serial Number
1072 — Gross Heat Input Nameplate Rating (MMBtu/hr)
N/A — Burner Manufacturer
N/A — Burner Model Number
N/A — Burner Serial Number
N/A — Potential Fuel Flow Rate
☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:
- ☒ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☒ Fly Ash Re-injection
- ☐ Other (specify): _____

b. Liquid Fuel:
- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): _____

c. Gaseous Fuel:
- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): _____

2. Combustion Type:
- ☐ Tangential Firing
- ☐ Opposite End Firing
- ☐ Limited Excess Firing
- ☐ Flue Gas Recirculation
- ☐ Staged Combustion
- ☐ Biased Firing
- ☒ One End Only Firing
- ☐ Other (specify): _____

B. Internal Combustion Engines/Combustion Turbines ☒ Not Applicable

Manufacturer
Model Number
Serial Number
☐ gal/hr ☐ mmcf/hr
Fuel Flow Rate
☐ hp ☐ kW
Engine Output Rating
Reason for Engine Use

Revision Date: October 30, 2003

Form ARD-2

C. Stack Information

Is unit equipped with multiple stacks? ☒ Yes1 ☐ No *(if yes, provide data for each stack)*

Identify other devices on this stack: Primary Stack: MK Unit #2; Secondary Stack: none

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☒ Yes ☐ No

If yes, Describe: Opacity, SO_2, NOx, CO_2, Flow

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe:

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

Primary: 21.2 Alternate: 14.5
Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2)

Primary: 445 Alternate: 317
Discharge height above ground level (ft)

Primary: 1,362,620 Alternate: 1,200,000
Exhaust Flow (acfm)

N/A
Exhaust Velocity (ft/sec)

Primary: 130.8 °F Alternate: 335 °F
Exhaust Temperature (°F)

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Varies
Supplier's Name

Street

Town/City State Zip Code

Telephone Number

2. Fuel Additives:

N/A
Manufacturer's Name

Street

Town/City State Zip Code

Telephone Number

Identification of Additive

Consumption Rate (gallons per 1000 gallons of fuel)

3. Fuel Information[2] *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input[3] (MMBtu/hr)	Actual Annual Usage[4] (specify units)
Coal	1.7	7.3	6.4	13,864 Btu/lb	1238	319,301 tons

[1] Unit #1 will employ the new FGD chimney as its primary stack and the existing Unit #2 stack as secondary stack during Unit #2 and FGD planned maintenance overhauls.
[2] Fuel information: Quarterly average, monthly composite samples, as determined. Source: MK_LAB/FuelAnalysis.xls
[3] Heat input of Unit #1 as specified in permit.
[4] Actual annual usage based on calendar year 2006 fuel usage as reported April 15, 2007.

Form ARD-2

#2 Oil	0.01	N/A	N/A	136,239 Btu/gal	1238	25,927 gallons

B. Hours of Operation

Hours per day: 24 Days per year: 365

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

- ☐ baffled settling chamber
- ☐ long cone cyclone
- ☐ multiple cyclone (inch diameter)
- ☒ electrostatic precipitator (two ESPs in series)
- ☐ spray tower
- ☐ venturi scrubber
- ☐ afterburners (incineration)
- ☒ selective catalytic reduction (SCR)
- ☐ reburn
- ☐ wide bodied cyclone
- ☐ irrigated long cone cyclone
- ☐ carbon absorption
- ☐ irrigated electrostatic precipitator
- ☐ absorption tower
- ☐ baghouse
- ☐ packed tower/column
- ☐ selective non-catalytic reduction
- ☒ other: flue gas desulfurization (FGD) system

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	N/A	N/A	N/A	N/A
SO_2	N/A	N/A	N/A	N/A	N/A
NOx	N/A	N/A	N/A	N/A	N/A
CO	N/A	N/A	N/A	N/A	N/A
VOC	N/A	N/A	N/A	N/A	N/A

Method used to determine entering emissions: N/A

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other (specify):

C. Operating Data

1. Expected ESP Efficiency: > 90 % Verified by: ☐ test ☐ calculations
2. Expected SCR Efficiency: > 85 % Verified by: ☐ test ☐ calculations
3. Expected FGD Efficiency: > 90 % SO2; > 80% Hg Verified by: ☐ test ☐ calculations
4. Normal Operating Conditions *(supply the following data as applicable)*

N/A Total gas volume through unit (acfm)	N/A Temperature (°F)	N/A Percent Carbon Dioxide (CO_2)
N/A	N/A	N/A

Voltage	Spark Rate	Milliamps
N/A	N/A	
Pressure Drop (inches of water)	Liquid Recycle Rate (gallons per minute)	

IV. DEVICE EMISSIONS DATA:

Pollutant	Actual (lb/hr)[5]	Potential (lb/hr)[6]	Actual (ton/yr)[7]	Potential (ton/yr)
PM	96.2	281.03	351.1	1,463.1
SO_2	2,738.7	6,724.4	9,998.0	29,456.0
NOx	454.2	1,508.3	1,658.0	6,606.5
CO	21.9	24.25	79.9	106.32
VOCs	4.8	5.34	17.5	23.39

Method used to determine exiting emissions:

☒ stack test ☒ vendor data ☒ emission factor ☐ material balance

☒ other (specify): Continuous Emissions Monitoring System (CEMS)

[5] Actual lb/hr emissions of SO2 and NOx are calculated based on certified CEM emissions data; actual lb/hr emissions of PM are calculated based on stack test data; actual lb/hr emissions of VOCs and CO are calculated using AP42 emission factors.
[6] Potential lb/hr and tons per year emissions are calculated using maximum permit allowable.
[7] Actual tons per year based on 2006 emissions as reported on April 15, 2007.

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Unit #2 – Steam Electric Boiler
Date Construction Commenced: _____ **Device Start-Up Date:** 1968

A. Boiler ☐ Not Applicable

Babcock & Wilcox — Boiler Manufacturer
UP-42 — Boiler Model Number
N/A — Boiler Serial Number
3015 — Gross Heat Input Nameplate Rating (MMBtu/hr)
N/A — Burner Manufacturer
N/A — Burner Model Number
N/A — Burner Serial Number
N/A — Potential Fuel Flow Rate
☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:
- ☒ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☒ Fly Ash Re-injection
- ☐ Other (specify): _____

b. Liquid Fuel:
- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): _____

c. Gaseous Fuel:
- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): _____

2. Combustion Type:
- ☐ Tangential Firing
- ☒ Opposite End Firing
- ☐ Limited Excess Firing
- ☒ Flue Gas Recirculation
- ☐ Staged Combustion
- ☐ Biased Firing
- ☐ One End Only Firing
- ☐ Other (specify): _____

B. Internal Combustion Engines/Combustion Turbines ☒ Not Applicable

Manufacturer
Model Number
Serial Number
Fuel Flow Rate
☐ gal/hr ☐ mmcf/hr
Engine Output Rating
☐ hp ☐ kW
Reason for Engine Use

Form ARD-2

C. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: MK Unit #1

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☒ Yes ☐ No

If yes, Describe: Opacity, SO_2, NOx, CO_2, Flow,

Is stack capped or otherwise restricted? ☐ Yes ☒ No

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

21.2
Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2)

445
Discharge height above ground level (ft)

1,362,620
Exhaust Flow (acfm)

N/A
Exhaust Velocity (ft/sec)

130.8 °F
Exhaust Temperature (°F)

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Varies
Supplier's Name

Street

Town/City State Zip Code

Telephone Number

2. Fuel Additives:

N/A
Manufacturer's Name

Street

Town/City State Zip Code

Telephone Number

Identification of Additive

Consumption Rate (gallons per 1000 gallons of fuel)

3. Fuel Information[1] *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input[2] (MMBtu/hr)	Actual Annual Usage[3] (specify units)
Coal	1.6	7.6	6.4	13,679 Btu/lb	3,473	937,595 tons
#2 Oil	0.01	N/A	N/A	136,239 Btu/gal	3,473	29,070 gallons

[1] Fuel information: Quarterly average, monthly composite samples, as determined. Source: MK_LAB/FuelAnalysis.xls.
[2] Heat input of Unit #1 as specified in permit.
[3] Actual annual usage based on calendar year 2006 fuel usage as reported April 15, 2007.

Form ARD-2

B. Hours of Operation

Hours per day: 24 Days per year: 365

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

- ☐ baffled settling chamber
- ☐ long cone cyclone
- ☐ multiple cyclone (inch diameter)
- ☒ electrostatic precipitator (two ESPs in series)
- ☐ spray tower
- ☐ venturi scrubber
- ☐ afterburners (incineration)
- ☒ selective catalytic reduction (SCR)
- ☐ reburn
- ☐ wide bodied cyclone
- ☐ irrigated long cone cyclone
- ☐ carbon absorption
- ☐ irrigated electrostatic precipitator
- ☐ absorption tower
- ☐ baghouse
- ☐ packed tower/column
- ☐ selective non-catalytic reduction
- ☒ other: flue gas desulfurization(FGD) system

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	N/A	N/A	N/A	N/A
SO_2	N/A	N/A	N/A	N/A	N/A
NOx	N/A	N/A	N/A	N/A	N/A
CO	N/A	N/A	N/A	N/A	N/A
VOC	N/A	N/A	N/A	N/A	N/A

Method used to determine entering emissions: N/A

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other (specify):

C. Operating Data

1. Expected ESP Efficiency: > 90 % Verified by: ☐ test ☐ calculations
2. Expected SCR Efficiency: > 85 % Verified by: ☐ test ☐ calculations
3. Expected FGD Efficiency: > 90 % SO2; > 80% Hg Verified by: ☐ test ☐ calculations

4. Normal Operating Conditions *(supply the following data as applicable)*

Total gas volume through unit (acfm)	Temperature (°F)	N/A Percent Carbon Dioxide (CO_2)
N/A Voltage	N/A Spark Rate	N/A Milliamps
N/A Pressure Drop (inches of water)	N/A Liquid Recycle Rate (gallons per minute)	

Form ARD-2

IV. DEVICE EMISSIONS DATA:

Pollutant	Actual (lb/hr)[4]	Potential (lb/hr)[5]	Actual (ton/yr)[6]	Potential (ton/yr)
PM	71.3	789.6	260.2	3,458.6
SO_2	5,998.9	18,864.6	22,728.0	82,627.0
NOx	905.1	1,283.3	3,304.0	5,621.0
CO	64.23	68.1	234.5	298.3
VOCs	14.1	15.0	51.6	65.6

Method used to determine exiting emissions:

☒ stack test ☒ vendor data ☒ emission factor ☐ material balance

☒ other (specify): Continuous Emissions Monitoring System (CEMS)

[4] Actual lb/hr emissions of SO2 and NOx are calculated based on certified CEM emissions data; actual lb/hr emissions of PM are calculated based on stack testing data; actual lb/hr emissions of VOCs and CO are calculated using AP42 emission factors.
[5] Potential lb/hr and tons per year emissions calculated using maximum permit allowable.
[6] Actual tons per year based on 2006 emissions as reported on April 15, 2007.

Calculations

SO2	Permit Limit % Sulfur	Permit Limit Max Coal TPY	AP42 Actual lb/ton	Permit Limit Max Coal Ton/Hr	PTE TPY	PTE Lb/Hr
MK1	3.645	425,289	38(s)	48.5	29,453.39	6,724.52
MK2	3.645	1,193,078	38(s)	136.2	82,626.62	18,864.52

Sample Calculation

TPY AP42 factor * % sulfur * maximum coal throughput
38 * 3.645 * 425,289 / 2000 = 29,453

Lb/Hr TPY * 2000 / 8760
29,453 * 2000 / 8760

CO	Permit Limit Max Coal TPY	CO AP42 lb/ton	Permit Limit Max Coal Ton/Hr	PTE CO TPY	PTE CO Lb/Hr
MK1	425,289	0.5	48.50	106.32	24.25
MK2	1,193,078	0.5	136.20	298.27	68.10

Sample Calculation

TPY AP42 factor * Max Coal Throughput tons per year / 2000
0.5 * 425,289 / 2000

Lb/Hr AP42 factor * Max Coal Throughput tons per hour
0.5 * 48.5

PM	Permit Limit Max. TPY	Permit Limit Max. lb/mmBtu	Permit Limit Max Heat Input mmBtu/hr	PTE Lb/Hr
MK1	1,463	0.227	1238	281.03
MK2	3,459	0.27	3473	937.71

Sample Calculation

TPY Permit Limit

Lb/Hr Max lb/mmBtu limit * Max heat input
0.227 * 1238

VOCs	Permit Limit Max Coal TPY	AP42 lb/ton	Permit Limit Max Coal Ton/Hr	PTE Lb/Hr	PTE TPY
MK1	425,289	0.11	48.50	5.34	23.39
MK2	1,193,078	0.11	136.20	14.98	65.62

Sample Calculation

TPY AP42 factor * Max Coal Throughput tons per year / 2000
0.11 * 425,289 / 2000

Lb/Hr AP42 factor * Max Coal Throughput tons per hour
0.5 * 48.5

Emissions Calculations - Merrimack Station

Red indicates permit limit

MK1	SO2	29,453.39	tpy	=	AP42 factor (38)	* 3.645% sulfur content in fuel * Max Coal Throughput tons per year (425,289) / 2000								
MK2	SO2	82,626.62	tpy	=	AP42 factor (38)	* 3.645% sulfur content in fuel * Max Coal Throughput tons per year (1,193,078) / 2000								
MK1	SO2	6,724.52	lb/hr	=	TPY * 2000 / 8760									
MK2	SO2	18,864.52	lb/hr	=	TPY * 2000 / 8760									
CT	SO2	564.58	tpy	=	128.9 lb/hr * 8760 / 2000									
EB	SO2	38.96	lb/hr	=	170.64	tpy =	lb/hr * 8760 / 2000							
EB	SO2	40	tpy	=	9.13	lb/hr =	tpy * 2000 / 8760							
MK1	NOx	5000.5	tpy	=	13.7	tons per day * 365								
MK2	NOx	5621.0	tpy	=	15.4	tons per day * 365								
MK2	NOx	0.86	lb/mmBtu	=	13,082.1	tpy =	2,986.78	lb/hr						
MK1	NOx	1,141.67	lb/hr	=	tpy * 2000 / 8760									
MK2	NOx	1,283.33	lb/hr	=	tpy * 2000 / 8760									
CT	NOx	0.9	lb/mmBtu	=	1257.50	tpy =	287.1 lb/hr	=	0.9 lb/mmBtu * 319 mmBtu/hr * 8760 / 2000					
EB	NOx	13.72	lb/hr	=	60.09	tpy =	13.72 lb/hr * 8760							
EB	NOx	25	tpy	=	5.71	lb/hr =	tpy * 2000 / 8760							
MK1	CO	106.32	tpy	=	AP42 factor (0.5) / 2000 *	Max Coal Throughput tons per year (425,289)								
MK2	CO	298.27	tpy	=	AP42 factor (0.5) / 2000 *	Max Coal Throughput tons per year (1,193,078)								
MK1	CO	24.27	lb/hr	=	tpy * 2000 / 8760									
MK2	CO	68.10	lb/hr	=	tpy * 2000 / 8760									
CT	CO	67.1	tpy	=	15.32	lb/hr =	tpy * 2000 / 8760							
EB	CO	3.43	lb/hr	=	15.02	tpy =	lb/hr * 8760 / 2000							
EB	CO	100	tpy	=	22.83	lb/hr =	tpy * 2000 / 8760							
MK1	TSP	1,463	tpy	=	334.02	lb/hr =	tpy * 2000 / 8760							
MK2	TSP	3,458.60	tpy	=	789.63	lb/hr =	tpy * 2000 / 8760							
MK1	TSP	0.27	lb/mmBtu	=	1464.06	tpy =	334.26	lb/hr = 0.27 * 1238 mmBtu/hr * 8760 / 2000						
MK2	TSP	0.227	lb/mmBtu	=	3453.06	tpy =	788.37	lb/hr = 0.227 * 3473 mmBtu/hr * 8760 / 2000						
CT	TSP	53.1	tpy	=	12.12	lb/hr * 8760 / 2000								
EB	TSP	2.26	lb/hr	=	9.90	tpy =	lb/hr * 8760 / 2000							
EB	TSP	15	tpy	=	3.42	lb/hr * 8760 / 2000								
MK1	VOC	23.39	tpy	=	AP42 factor (0.11) / 2000 *	Max Coal Throughput tons per year (425,289)								
MK2	VOC	65.62	tpy	=	AP42 factor (0.11) / 2000 *	Max Coal Throughput tons per year (1,193,078)								
MK1	VOC	5.34	lb/hr	=	tpy * 2000 / 8760									
MK2	VOC	14.98	lb/hr	=	tpy * 2000 / 8760									
CT	VOC	23.75	tpy	=	5.42	lb/hr * 8760 / 2000								
EB	VOC	0.14	lb/hr	=	0.61	tpy =	lb/hr * 8760 / 2000							
EB	VOC	25	tpy	=	5.71	lb/hr * 8760 / 2000								

Public Service
of New Hampshire

PSNH Energy Park
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105-0330
(603) 669-4000
www.psnh.com

The Northeast Utilities System

September 4, 2007

Mr. Craig A. Wright, Administrator
Bureau of Permitting & Environmental Health
Air Resources Division
NH Dept of Environmental Services
PO Box 95, 29 Hazen Drive
Concord NH 03302-0095

Re: Temporary Permit Application – Public Service of New Hampshire
Merrimack Station Facility, Bow, New Hampshire
Facility ID # 3301300026; Application # FY07-0103

Dear Mr. Wright:

In response to your request, dated August 6, 2007, for additional information relative to the above mentioned permit application, Public Service Company of New Hampshire provides the enclosed conceptual design drawings showing the general arrangement of the FGD system. These conceptual design drawings were prepared by Sargent and Lundy for PSNH as part of an initial feasibility study to determine if a FGD system could be installed at Merrimack Station. These conceptual design drawings, which may change as the project progresses, are being provided for your review pending the availability of engineering drawings showing the proposed equipment building dimensions and location of the new exhaust stack. Based on the preliminary project schedule, engineering drawings showing the proposed equipment dimensions and locations will be available in the third quarter of 2008 after FGD and Chimney Contract Awards.

With regard to the completion of the required ambient air quality impact analysis, representatives of PSNH met with the NH Department of Environmental Services, Air Resources Division (DES ARD) on August 13, 2007 to review and discuss the completion of AERMOD in accordance with state and federal regulations, specifically Env-A 606 and 40 CFR 51, Appendix W, and policy including NHDES-ARD Procedure for Air Quality Impact Modeling, April 2005. During this meeting, PSNH provided DES ARD with a draft modeling protocol, as well as preliminary building data and GEP analysis, preliminary emissions calculations, and computer generated site images generated using conceptual preliminary design specifications. Following this meeting, PSNH received DES ARD's comments on the draft protocol via email from Lisa Landry on August 24, 2007. As requested in Lisa Landry's August 24, 2007 email, PSNH will revise the draft protocol as necessary and proceed with the submittal of a formal modeling protocol. I anticipate a revised protocol will be submitted following discussions with Mr. Brian Hennessey of the United States Environmental Protection Agency, Region I, as recommended by DES ARD.

In addition to providing the information requested I would like to provide the most current preliminary project schedule containing project milestones and anticipated target dates:

Preliminary Engineering	January – December 2006
Solicit/Evaluate Bids for Program Manager	April – September 2007
Award Program Manager Contract	September 2007
Solicitation of Bids for FGD and Chimney	November 2007 – April 2008
Award FGD and Chimney Contract(s)	May 2008
Detail Design	May 2008 – January 2010
Completion of Construction	December 2012
Start-up, Commissioning, and Performance Testing	January – June 2013

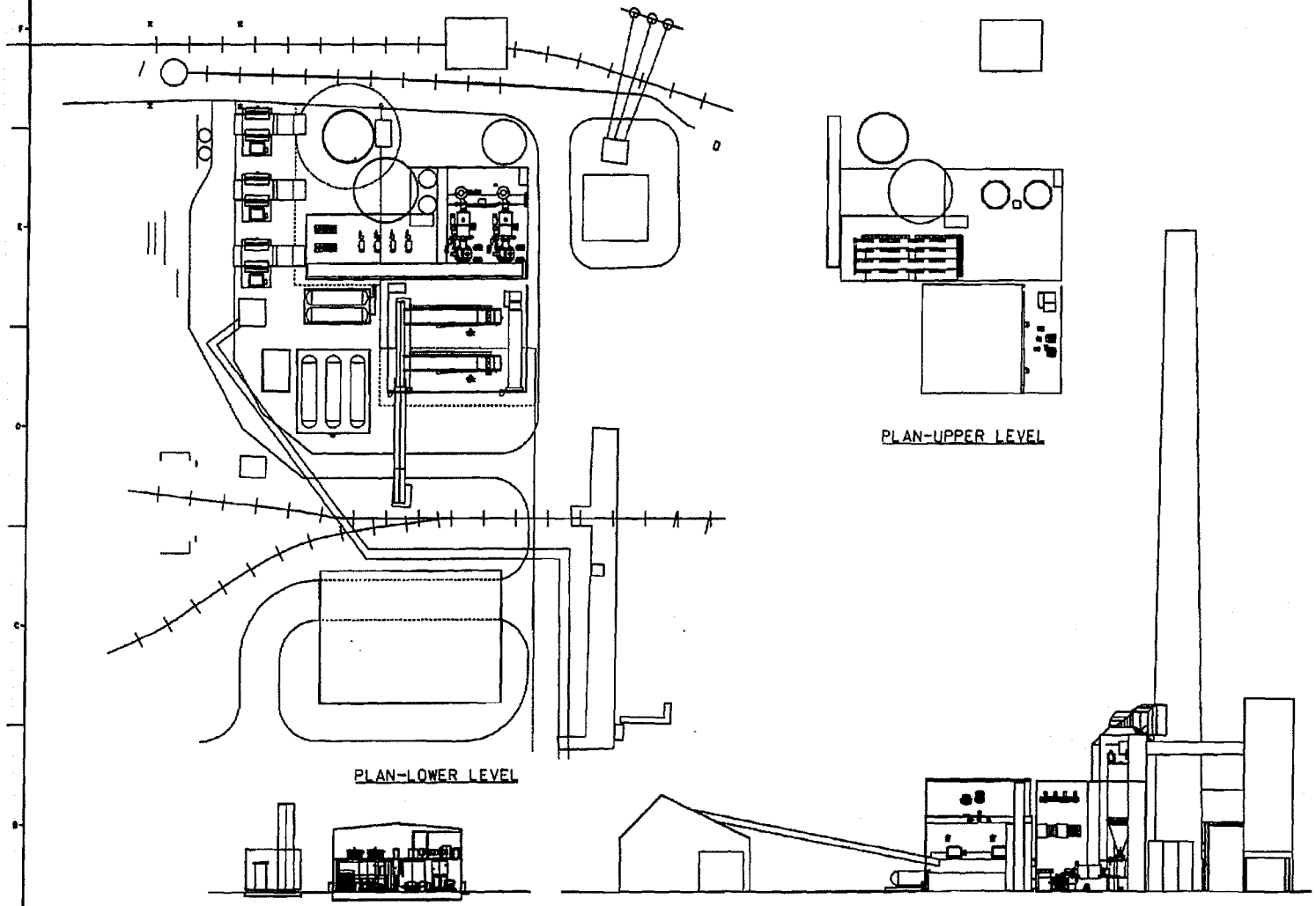
As indicated in my letter of June 6, 2007, periodic updates to the project schedule will be provided to DES ARD as needed throughout the completion of the Clean Air Project.

If you need additional information or would like to discuss the enclosed plans and/or schedule, please contact me at 634-2851 or smaguwh@nu.com or Laurel L. Brown, Senior Environmental Analyst – Generation at 634-2331 or brownll@nu.com.

Sincerely,

William H. Smagula, P.E.
Director – Generation

cc: Gary Milbury, DES ARD



PRELIMINARY

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL FOR THAT OF ITS SUBCONTRACTORS) IN PERFORMING THE WORK.

FILENAME: new-site-arrgd.DGN

DRAWING RELEASE RECORD						DRAWING RELEASE RECORD					
REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
						A					PRELIMINARY DESIGN

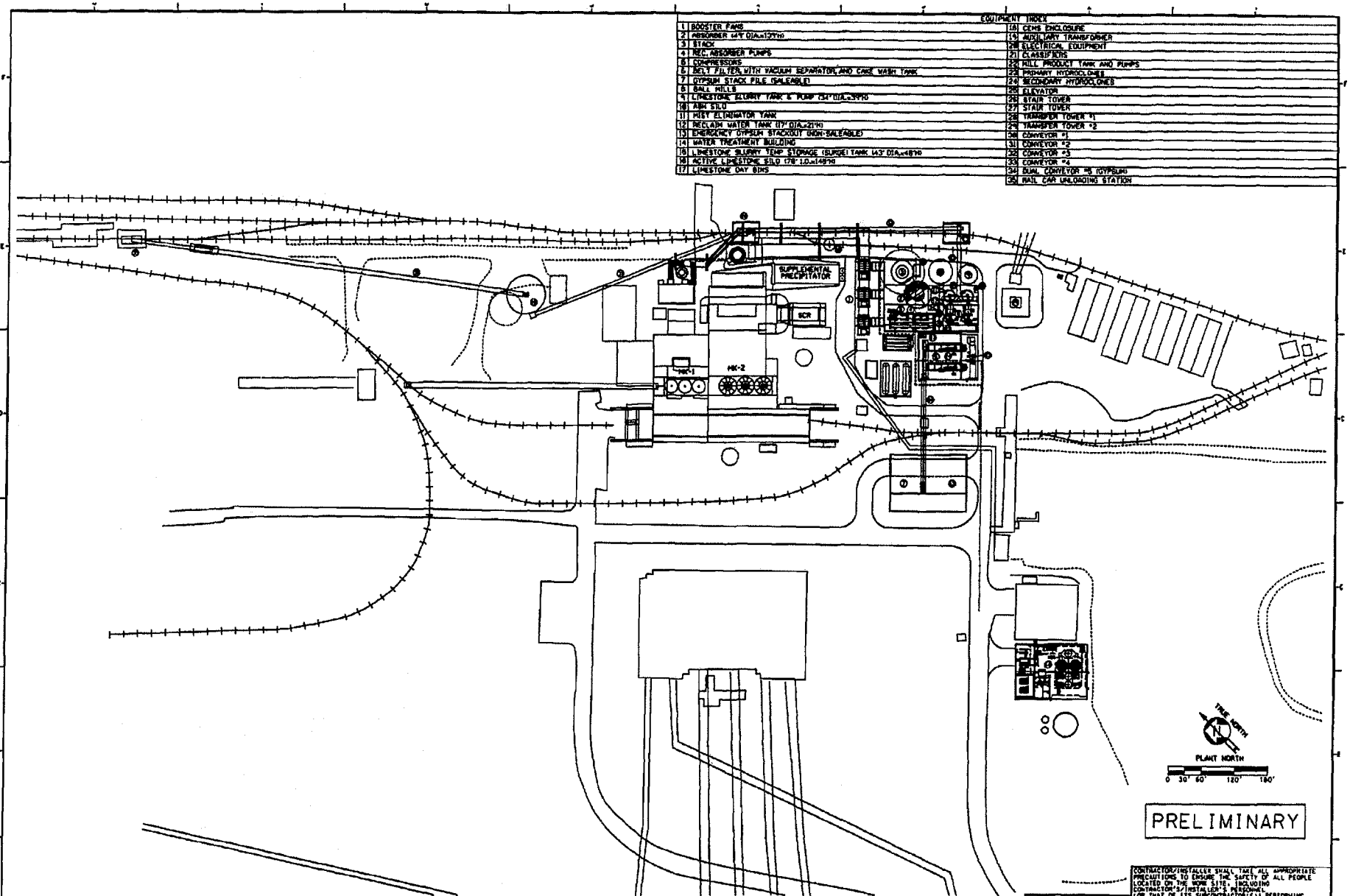
SCALE: 60' WT.

PROJECT NUMBER

PROPERTY DEVELOPMENT
GENERAL ARRANGEMENT

DRAWING NO. M-GA-001 REV. A

SHEET 02 OF 02


EQUIPMENT INDEX
1 BOOSTER FANS
2 ABSORBER 44'T DIA.x127'H
3 STACK
4 REC. ABSORBER PUMPS
5 COMPRESSORS
6 BELT FILTER WITH VACUUM SEPARATOR AND CAKE WASH TANK
7 GYPSUM STACK PILE (SALEABLE)
8 BALL MILLS
9 LIMESTONE SLURRY TANK & PUMP (34' DIA.x39'H)
10 ABH SILO
11 MIST ELIMINATOR TANK
12 RECLAIM WATER TANK (17' DIA.x21'H)
13 EMERGENCY GYPSUM STACKOUT (NON-SALEABLE)
14 WATER TREATMENT BUILDING
15 LIMESTONE SLURRY TEMP STORAGE (SURGE) TANK (43' DIA.x48'H)
16 ACTIVE LIMESTONE SILO (78' L.D.x148'H)
17 LIMESTONE DAY BINS
18 CEMS ENCLOSURE
19 AUXILIARY TRANSFORMER
20 ELECTRICAL EQUIPMENT
21 CLASSIFIERS
22 MILL PRODUCT TANK AND PUMPS
23 PRIMARY HYDROCLONES
24 SECONDARY HYDROCLONES
25 ELEVATOR
26 STAIR TOWER
27 STAIR TOWER
28 TRANSFER TOWER #1
29 TRANSFER TOWER #2
30 CONVEYOR #1
31 CONVEYOR #2
32 CONVEYOR #3
33 CONVEYOR #4
34 DUAL CONVEYOR #5 (GYPSUM)
35 RAIL CAR UNLOADING STATION
SUPPLEMENTAL PRECIPITATOR
SCR
MK-1
MK-2
TRUE NORTH
PLANT NORTH
0 30' 60' 120' 180'
PRELIMINARY
CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL, OR THAT OF ITS SUBCONTRACTOR(S) PERFORMING THE WORK.
FILENAME:new-site-orng.DG
DRAWING RELEASE RECORD
REV. | DATE REL'D. | PREPARED | REVIEWED | APPROVED | PURPOSE
DRAWING RELEASE RECORD
REV. A | DATE REL'D. | PREPARED ANK | REVIEWED | APPROVED | PRELIMINARY DESIGN
SCALE 60'-0"
PROJECT NUMBER
PROPERTY DEVELOPMENT
GENERAL ARRANGEMENT
DRAWING NO. M-GA-001
REV. A
SHEET 01 OF 02

Public Service
of New Hampshire

PSNH Energy Park
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105-0330
(603) 669-4000
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The Northeast Utilities System

October 24, 2008

Ms. Michele R. Andy, Administrator
Bureau of Permitting & Environmental Health
Air Resources Division
NH Dept. of Environmental Services
PO Box 95, 29 Hazen Drive
Concord, NH 03301

Public Service Company of New Hampshire
Temporary Permit Application #FY07-0103
Merrimack Station – Bow, New Hampshire

Dear Michele:

As you know, Public Service Company of New Hampshire (PSNH) has retained URS, Washington Division, to provide engineering, procurement support, and construction management services for the installation of a flue gas desulfurization (FGD scrubber) system. As a result, enclosed you will find additional information pertinent to the FGD scrubber design, the latest engineering drawings, and an updated project schedule to supplement PSNH's application for a temporary permit, Application # FY07-0103.

Currently, the tentative preliminary project schedule containing project milestones and anticipated target dates is as follows:

Preliminary Engineering	January – December 2006
Solicitation of Bids for Program Manager	April – August 2007
Award Program Manager Contract	September 2007
Develop Final Project Specifications	August 2007 – March 2009
Solicitation of Bids for FGD and Chimney	November 2007 – February 2008
Award FGD and Chimney Contract(s)	July 2008
Solicitation of Bids for Material Handling	March – October 2008
Award Material Handling Contract	October – November 2008
Initiation of Pre-Construction Site Preparation	November 2008
Commencement of Construction	March 2009
Completion of Construction	December 2012
Start-up, Commissioning, and Performance Testing	October 2011 – June 2013

As required by RSA 125-O:13, I, the FGD scrubber or wet Limestone Forced Oxidation (LSFO) process is being installed at Merrimack Station to control mercury (Hg) emissions from Merrimack Units #1 and #2. Mercury is controlled by the absorption of the ionic form (Hg^{++}) in the scrubber liquor. Provisions will be incorporated to allow for the use, if necessary, of chemical additives to inhibit reduction of ionic mercury, the elemental form, (Hg0) and subsequent re-emission.

As a co-benefit, sulfur dioxide (SO2) emissions will also be reduced. In the wet LSFO process, hot flue gas enters an absorber spray tower where it contacts dilute calcium carbonate and sulfate/sulfite slurry. The dissolved SO2 reacts with the calcium carbonate in solution and the slurry drains into an absorber reaction tank that is integral with the spray tower. The SO2 reaction with calcium carbonate initially forms calcium sulfite. Air is sparged into the reaction tank to oxidize the calcium sulfite to calcium sulfate, commonly known as gypsum.

Two key systems associated with the wet LFSO process are (1) the Limestone Storage and Handling System and (2) the Reagent Preparation System. The Limestone Storage and Handling System consists of the equipment necessary to receive, convey, and store limestone received by rail car, as well as equipment to reclaim and convey material to the limestone day silos. Limestone will be delivered to Merrimack Station approximately every four weeks by train, and unloaded using the rail car dumper into the receiving hopper. If rail delivery is temporarily interrupted or unavailable, limestone will be delivered by truck.

The Limestone Handling System unloading, transfer and reclaim / silo fill conveyor system design is based on a single belt conveyor train arrangement. During periods when the belt conveyor train is unavailable, a back-u[bucket elevator located adjacent to the limestone day silos will be used to fill the limestone day silos. The limestone storage silo, configured to store a 35-day supply, will be equipped with an emergency gravity discharge arrangement which will allow the formation of a limestone pile adjacent to the silo. If necessary, limestone from the pile can be transported to the back-up bucket elevator.

The Limestone Handling System design is based on a maximum limestone consumption rate of 17.4 tons per hour at 100% capacity for Merrimack Units #1 and #2, when burning the design basis 3% sulfur coal. Particulate emissions from the Limestone Handling and Storage System are below the applicability thresholds established in Env-A 618 and 619. The calculations, as well as assumptions and control efficiencies, are enclosed.

The Reagent Preparation System consists of limestone storage silos, limestone feeders, limestone grinding mills, mill slurry tanks with agitators, mill slurry pumps, and two reagent storage tanks. Based on the preliminary design specifications, the raw limestone reagent will be ground and slurried on-site in either of two 100% wet ball mill systems. The product slurry from the mills is stored in two 50% reagent storage tanks. Reagent slurry is pumped to the absorbers and back to the reagent storage tank via two recirculation loops (one operating and one spare).

Pursuant to the definition of "non-metallic mineral processing plant" contained in Env-A 610.03, the limestone grinding mills qualify as a fixed non-metallic mineral processing plant. As currently designed, the maximum design capacity of each limestone grinding mill is below the applicability thresholds contained in Env-A 607.01(l) and Env-A 610.04(b)(2) and 40 CFR 60, Subpart OOO. Although the system design includes two wet ball mills, only one will be operated at any given time. Final design specifications and technical data for the limestone grinding mills will be provided during the detail design phase of the project.

With regard to the completion of the required ambient air quality impact analysis, PSNH submitted a protocol to the New Hampshire Department of Environmental Services, Air Resources Division (DES) on February 29, 2008. PSNH received DES' comments on March 21, 2008, and responded to those comments on March 24, 2008 and June 19, 2008. PSNH received final comments and approval from DES on July 23, 2008. In order to expedite the review/approval by DES, PSNH submitted AERMOD MetData files to DES on September 8, 2008 and AERMET input files to DES on September 9, 2008. The final ambient air quality impact analysis is currently in the final stages. Following the completion of ambient air quality impact analysis, a final report will be submitted to DES for review and approval. The submittal of the final ambient air quality impact analysis, combined with the information contained in this letter, will satisfy the application deficiencies identified in Craig Wright's letter to me, dated August 6, 2007.

PSNH requests that DES issue a completeness determination in accordance with Env-A 607.05, within fourteen (14) days of receipt of the final ambient air quality analysis, and schedule a public hearing on a draft permit as soon as possible.

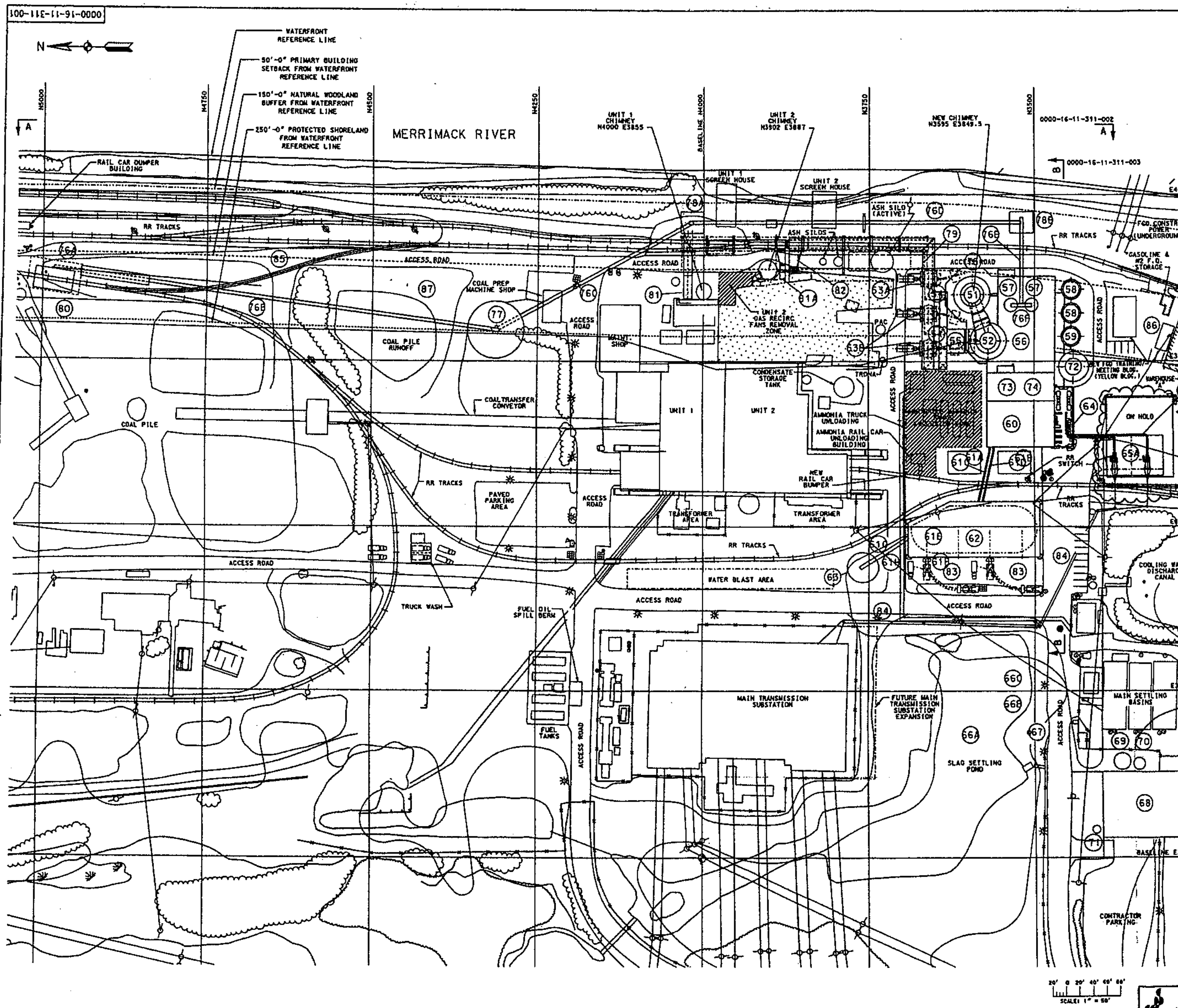
If you have questions or would like to discuss the enclosed schedule, drawings, and/or information, please contact me at 634-2851, or Laurel Brown, Senior Environmental Analyst – Generation, at 634-2331.

Sincerely,

William H. Smagula, P.E.
Director – Generation

Enclosures

cc: Gary D. Milbury, Jr., DES ARD



NEW FGD FACILITIES LEGEND:

51 CHIMNEY
52 ABSORBER VESSEL
53A FGD BOOSTER FAN UNIT 1
53B FGD BOOSTER FANS UNIT 2
54 FGD BOOSTER FANS DISCHARGE DUCT
55 ABSORBER VESSEL INLET DUCT
56 ABSORBER BUILDING
57 BALL MILLS & DAY SILOS
58 REAGENT STORAGE TANKS & PUMPS (30'Ø X 31'H)
59 RECLAIM WATER TANK & PUMP (30'Ø X 33'H)
60 GYPSUM VACUUM FILTERS & PUMP SKIDS
61C GYPSUM TRANSFER CONVEYOR G-2A
61D GYPSUM TRANSFER CONVEYOR G-2B
61G OFF SPEC GYPSUM EMERGENCY STACKER CVYR G-4A
61H OFF SPEC GYPSUM EMERGENCY STACKER CVYR G-4B
62 GYPSUM STORAGE ENCLOSURE (5 DAY STORAGE) (200'LG X 85'W)
63 OFF SPEC GYPSUM PILE
64 PDC (POWER DISTRIBUTION CENTER) (28'W X 90'LG)
65A FGD SUBSTATION (102'-6"W X 115'-9"LG ON HOLD)
65B MEDIUM VOLTAGE OVERHEAD BUS DUCT
68 WASTE WATER TREATMENT BUILDING
69 WWT EQUALIZATION TANK & PUMPS (25'Ø X 27'H)
70 WWT MAINTENANCE TANK & PUMP (18'Ø X 18'H)
71 HYDRATED LIME SILO
72 ABSORBER HOLD TANK & PUMP (45'Ø X 50'H)
73 AIR COMPRESSORS
74 COMPRESSORS & DRYERS
76A LIMESTONE TRANSFER CONVEYOR L-1
76B LIMESTONE TRANSFER CONVEYOR L-2
76C LIMESTONE TRANSFER CONVEYOR L-3
76D LIMESTONE TRANSFER CONVEYOR L-4
76E LIMESTONE TRANSFER CONVEYOR L-5
76E LIMESTONE REVERSING CONVEYOR L-6
77 LIMESTONE SILO 86'Ø X 130'H
78A LIMESTONE TRANSFER TOWER TT-1
78B LIMESTONE TRANSFER TOWER TT-2
79 FGD BOOSTER FANS INLET DUCT
80 RAIL CAR (LIMESTONE) UNLOADING STATION
81 UNIT 1 DUCT
81A UNIT 1 BYPASS DUCT
82 UNIT 2 DUCT
83 GYPSUM TRUCK LOADING AREA
84 115KV OVERHEAD POWERFEED FOR SCRUBBER SWITCHYARD
85 LIMESTONE DELIVERY RR SPUR
86 FGD CONSTRUCTION SWITCHYARD
87 TRUCK WASH FACILITY

NOTES:

1. FOR DEMOLITION OF EXISTING PLANT STRUCTURES SEE DRAWING 0000-16-11-700-001
2. FOR RELOCATED/NEW PLANT STRUCTURES SEE DRAWING 0000-16-11-313-(LATER)
3. ALL INFORMATION IS CONCEPTIONAL AND REQUIRES CONFIRMATION DURING DETAIL DESIGN.

OPEN ITEMS:

1. CIRCULATING WATER PIPING CLOSED SYSTEM.
2. ~~UNIT 1 ANHYDROUS AMMONIA TANKS LOCATION & ORIENTATION.~~ NOT AN ISSUE AT THIS TIME
3. ~~PDC (POWER DISTRIBUTION CENTER) LOCATION (ITEM 64)~~
4. ~~ELEVATOR (ITEM 56,57)~~
5. ~~USE OF EXISTING TRUCK SCALE.~~ ADD NEW SCALE
6. ~~LIMESTONE LOADING & TRANSFER SYSTEM (ITEM 76,77,78,80)~~
7. FGD BOOSTER FANS & DUCTWORK (ITEM 53A,53B, 54,55,79,81,82)
8. ~~GYPSUM STORAGE CAPACITY (ITEM 62,63)~~
9. TRUCK WASH FACILITY (ITEM 87)
10. ~~LABORATORY FOR FGD & WWT AREA (ITEM 56, 60)~~
11. LIMESTONE DELIVERY RAIL CARS STAGING RR SPURS
12. EXTEND MAIN TRANSMISSION SUBSTATION TO THE SOUTH
13. ~~COAL RAIL CAR TRAFFIC DURING CONSTRUCTION~~
14. ~~TRUCK TRAFFIC TO ACTIVE ASH SILO DURING CONSTRUCTION~~
15. DUCT SUPPORTS
16. LOCATION OF SMALLER ASH SILOS NORTH OF MAIN ASH SILO
17. PARKING SPACES

REVISION APPROVAL RECORD				REV		No.	DATE	REVISIONS	BY	CHKD
DISCIPLINE	BY	DATE	DISCIPLINE	BY	DATE	A	1/18/06	ISSUED FOR SYSTEM SPEC 21-6-001 BID PACKAGE	[illegible]	WLB
ARCH.	-		MECHANICAL	WLB	2/26/06			THIS DRAWING SUPERSEDES DRAWING [illegible]		
CIVIL	-		NUCLEAR	-		B	2/26/06	ISSUED FOR BASELINE DESIGN.	JTS	[illegible]
ELECTRICAL	[illegible]	2/26/06	PIPING	[illegible]	2/26/06			REVISED FGD SUBSTATION TO 115'-9"x102'-6"LG. DELETED SW PUMPHOUSE AT		
ENVIRON.	-		PROCESS	[illegible]	2/26/06			SLAG SETTLING POND. ADDED PROTECTED SHORELAND, WOODLAND BUFFER,		
GEN. ARRANG.	-		QA / QC	-				PRIMARY BUILDING SETBACK & WATERFRONT REFERENCE LINE.		
HVAC	-		STRUCTURAL	[illegible]	2/26/06					
I & C	-		FIRE PROT.	-						

DRAWING STATUS				
ISSUED	REV	DATE	SUE	PCM
PRELIMINARY	B	2/26/06	WLB	[illegible]
APPROVED FOR CONSTRUCTION				

NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED. DESTROY ALL PRINTS BEARING EARLIER DATE &/OR REV.NO.

Clean Air Project

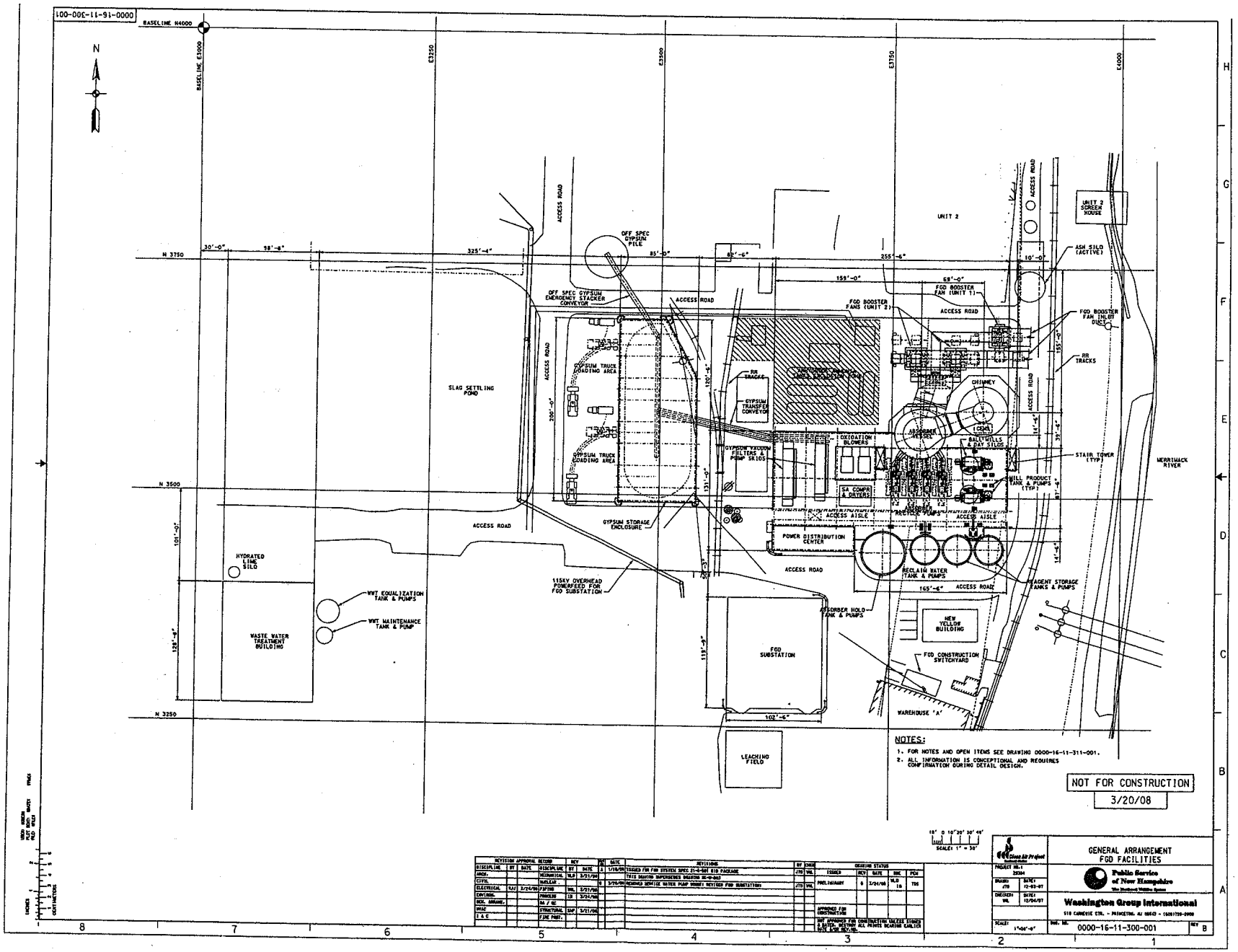
PROJECT NO.: 25394
DRAWN: [illegible] DATE: 10/31/07
CHECKED: [illegible] DATE: 11/8/07
SCALE: 1"=50'-0"

PLOT PLAN
FGD FACILITIES

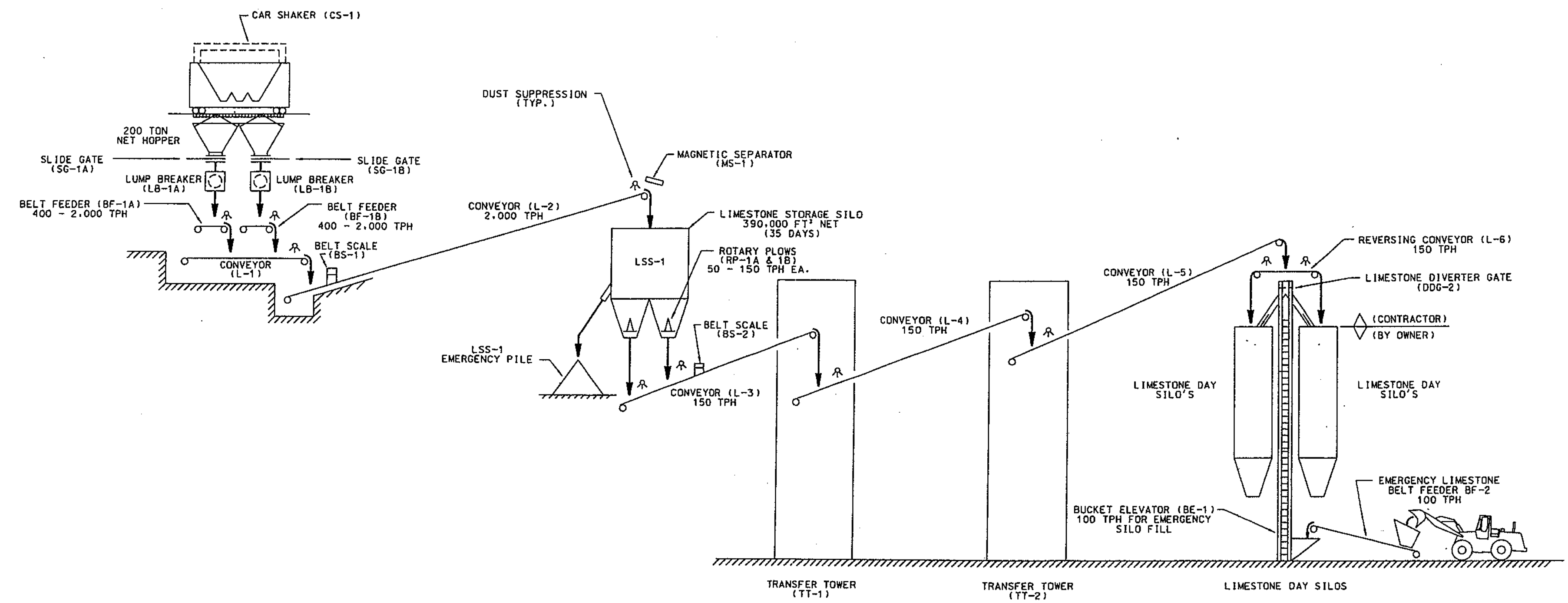
Public Service of New Hampshire

Washington Group International
510 CARNEGIE CTR. - PRINCETON, NJ 08543 - (609)720-2000

DWG. NO. 0000-16-11-311-001 REV B


0000-16-11-300-001
BASELINE N4000
BASELINE E3000
E3250
E3500
E3750
E4000
N 3750
N 3500
N 3250
ACCESS ROAD
OFF SPEC GYPSUM PILE
OFF SPEC GYPSUM EMERGENCY STACKER CONVEYOR
GYPSUM TRUCK LOADING AREA
SLAG SETTLING POND
GYPSUM TRANSFER CONVEYOR
GYPSUM VACUUM FILTERS & PUMP SK105
GYPSUM STORAGE ENCLOSURE
FGD BOOSTER FANS (UNIT 2)
FGD BOOSTER FAN (UNIT 1)
FGD BOOSTER FAN INLET DUCT
UNIT 2
UNIT 2 SCREEN HOUSE
ASH SILO (ACTIVE)
RR TRACKS
CHIMNEY
ABSORBER VESSEL
OXIDATION BLOWERS
BALLYMILLS & DAY SILOS
STAIR TOWER (TYP)
MERRIMACK RIVER
SA COMPR & DRYERS
MILL PRODUCT TANK & PUMPS (TYP)
RECYCLE PUMPS
ACCESS AISLE
POWER DISTRIBUTION CENTER
RECLAIM WATER TANK & PUMPS
REAGENT STORAGE TANKS & PUMPS
ABSORBER HOLD TANK & PUMPS
NEW YELLOW BUILDING
FGD CONSTRUCTION SWITCHYARD
WAREHOUSE 'A'
HYDRATED LIME SILO
WWT EQUALIZATION TANK & PUMPS
WWT MAINTENANCE TANK & PUMP
WASTE WATER TREATMENT BUILDING
115KV OVERHEAD POWERFEED FOR FGD SUBSTATION
FGD SUBSTATION
LEACHING FIELD
NOTES:
1. FOR NOTES AND OPEN ITEMS SEE DRAWING 0000-16-11-311-001.
2. ALL INFORMATION IS CONCEPTUAL AND REQUIRES CONFIRMATION DURING DETAIL DESIGN.
NOT FOR CONSTRUCTION
3/20/08
SCALE: 1" = 30'
GENERAL ARRANGEMENT
FGD FACILITIES
Public Service of New Hampshire
Washington Group International
0000-16-11-300-001
REV B

SK-PFD-001



USER: $USER$ PLOT SENT: $DATE$ $TIME$ FILE: $FILE$

REVISION APPROVAL RECORD

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CIVIL			NUCLEAR		
ELECTRICAL	RJJ	3/24/08	PIPING	WWL	3/21/08
ENVIRON.			PROCESS		
GEN. ARRANG.			QA / QC		
HVAC			STRUCTURAL		
I & C			FIRE PROT.		

REV NO.	DATE	REVISIONS	BY	CHKR
A	1/24/08	ISSUED WITH MATERIAL HANDLING SYSTEM STUDY FOR CLIENT REVIEW	RAF	WWL

DRAWING STATUS

ISSUED	REV	DATE	SDE	PEM
PRELIMINARY	A	3/21/08	WLD	TDS
APPROVED FOR CONSTRUCTION				

NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED. DESTROY ALL PRINTS BEARING EARLIER DATE &/OR REV.NO.

Clean Air Project

LIMESTONE HANDLING SYSTEM FLOW DIAGRAM

PROJECT NO.: 29384

DRAWN: RAF DATE: 1-17-08

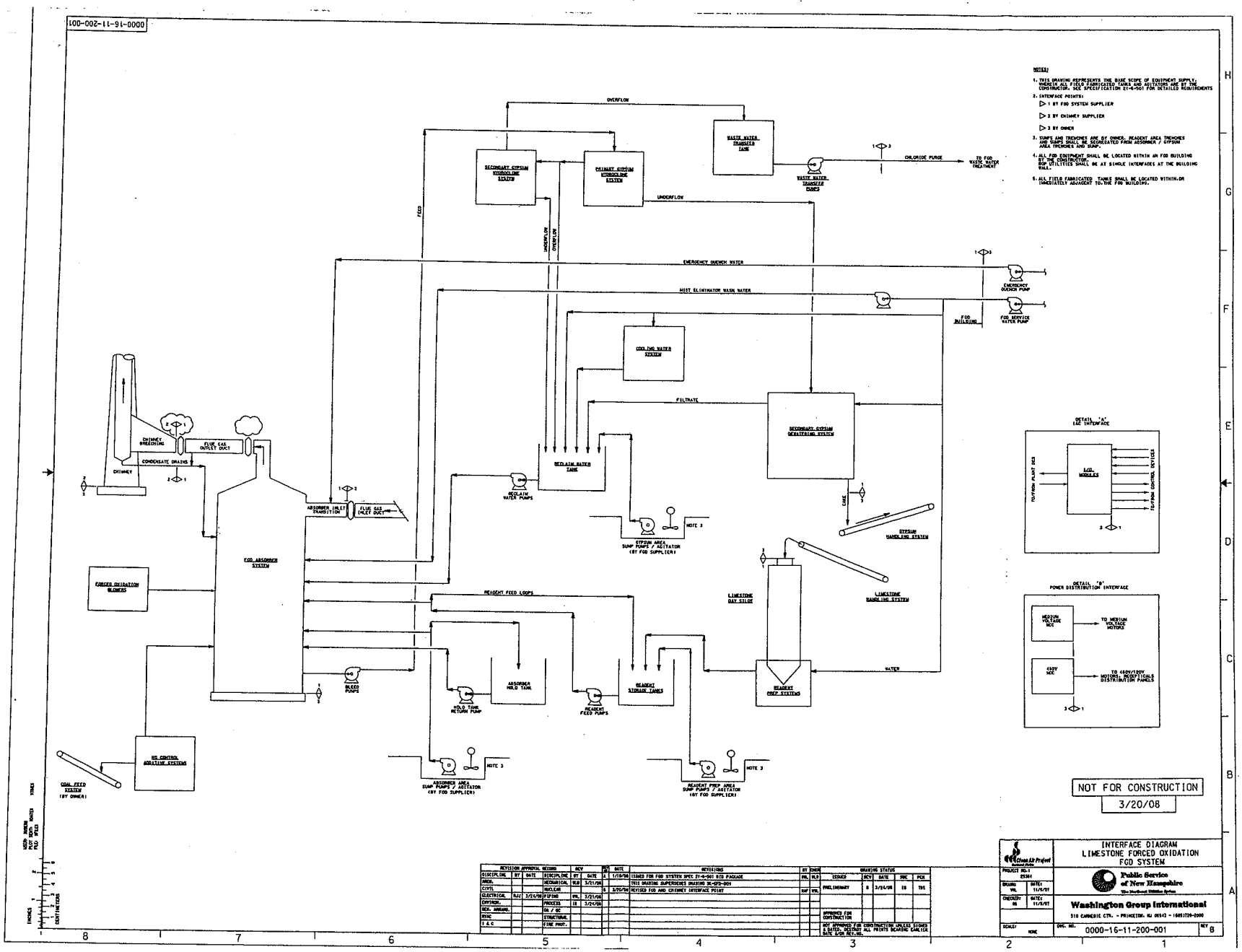
CHECKED: WWL DATE: 3/21/08

Public Service of New Hampshire
The Northeast Utilities System

Washington Group International
510 CARNEGIE CTR. - PRINCETON, NJ 08543 - (609)720-2000

SCALE: NONE

DWG. NO. SK-PFD-001 REV A



REVISION APPROVAL RECORD				REV		NO	DATE	REVISIONS	BY	CHKD
DISCIPLINE	BY	DATE	DISCIPLINE	BY	DATE	2	1/18/08	ISSUED FOR FGD SYSTEM SPEC 21-4-001 BID PACKAGE	MBL	MJD
ENGR.			MECHANICAL	MJD	3/21/08			THIS DRAWING SUPERSEDES DRAWING BC-672-001		
CIVIL			NUCLEAR			8	3/20/08	REVISED FGD AND CHIMNEY INTERFACE POINT	DAF	VBL
ELECTRICAL	RJJ	3/21/08	PIPING	MBL	3/21/08					
CHEMICAL			PROCESS	EB	3/24/08					
MECH. ARRANG.			QA / QC							
HVAC			STRUCTURAL							
I & C			FIRE PROT.							

DRAWING STATUS				
STATUS	ISSUED	REV	DATE	SDC	PCH
PRELIMINARY		0	3/21/08	EB	TBS
APPROVED FOR CONSTRUCTION					

NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED. DESTROY ALL PRINTS BEARING EARLIER DATE &/OR REV. NO.

Public Service of New Hampshire

PSNH Energy Park
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105-0330
(603) 669-4000
www.psnh.com

The Northeast Utilities System

November 21, 2008

Mr. Robert R. Scott, Director
Air Resources Division
NH Dept. of Environmental Services
PO Box 95, 29 Hazen Drive
Concord, NH 03301

Public Service Company of New Hampshire
Temporary Permit Application #FY07-0103
Merrimack Station – Bow, New Hampshire

Dear Mr. Scott:

Public Service Company of New Hampshire (PSNH) is submitting the enclosed *Air Quality Modeling Report* to supplement its application for a temporary permit for the construction of a new wet, limestone-based flue gas desulfurization (FGD) system at Merrimack Station. PSNH retained TRC to conduct ambient air quality modeling to demonstrate that predicted concentrations of pollutants from MK Station will be in compliance with National Ambient Air Quality Standards (NAAQS) for criteria pollutants and the Ambient Air Limits (AAL) for New Hampshire Regulated Toxic Air Pollutants (RTAP). As documented in the enclosed report, the total predicted concentrations, which are in most cases are less than half of the standards, are in compliance with all NAAQS for SO_2, PM_{10}, NO_2 and CO and with the AAL for ammonia.

With the submittal of the enclosed report, PSNH's application for a temporary permit should be complete. PSNH requests that DES issue a completeness determination, in accordance with Env-A 607.05, within fourteen (14) days of receipt of the final ambient air quality analysis and schedule a public hearing on a draft permit as soon as possible.

If you have questions or would like to discuss the enclosed report, please contact me at 634-2851 or Laurel Brown, Senior Environmental Analyst – Generation, at 634-2331.

Sincerely,

William H. Smagula, P.E.
Director – Generation

Enclosures

cc: Gary D. Milbury, Jr., DES ARD

Public Service of New Hampshire

PSNH Energy Park
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
P.O. Box 330
Manchester, NH 03105-0330
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The Northeast Utilities System

December 11, 2008

Mr. Robert R. Scott, Director
Air Resources Division
NH Dept. of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Public Service Company of New Hampshire
Merrimack Station, Clean Air Project
Temporary Permit Application for FGD System Installation

Dear Mr. Scott,

Public Service Company of New Hampshire (PSNH) is submitting the enclosed updated application forms as a supplement to the application for a temporary permit for the construction of a new wet, limestone-based flue gas desulfurization (FGD) system at Merrimack Station previously submitted to the NH Department of Environmental Services, Air Resources Division, on June 6, 2007. These updated application forms are being submitted at the request of Michelle Andy, Administrator, Permitting & Environmental Health Bureau, in order to provide more recent emissions data and emissions calculations.

Please contact me at 634-2851 or Laurel L. Brown, Senior Environmental Analyst – Generation at 634-2331, if you would like additional information relative to the Clean Air Project or the enclosed permit application.

Sincerely,

William H. Smagula, P.E.
Director – Generation

Enclosure

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division
P.O. Box 95
Concord, NH 03302-0095
Telephone: 603-271-1370

Form ARD-1

General Information for All Permit Applications

I. FACILITY INFORMATION - *Complete the following*:

A. Type of Application: ☐ New ☐ Renewal ☒ Modification – Installation of Scrubber

B. Physical Location:

PSNH Merrimack Station
Facility Name

97 River Road
Street

Bow | NH | 03304
Town/City | State | Zip Code

C. Mailing Address:

97 River Road
Street/P.O. Box

Bow | NH | 03304
Town/City | State | Zip Code

603.224.4081
Telephone Number

D. USGS Coordinates:

UTM	
Easting:	299.17
Northing:	4779.31

or

Latitude/Longitude			
N Latitude:	Deg 43	Min 08	Sec 28
W Longitude:	Deg 71	Min 28	Sec 09

E. Owner:

Public Service Company of NH
Company

780 North Commercial Street
Street/P.O. Box

Manchester | NH | 03101
Town/City: | State | Zip Code

603.669.4000
Telephone Number

F. Parent Corporation:

Northeast Utilities
Company

PO Box 270
Street/P.O. Box

Hartford | CT | 06141
Town/City: | State | Zip Code

860.665.5000
Telephone Number

G. Contact Information

1. General/Technical Contact:

Richard R. Roy
Contact Person

Engineer – Merrimack Station
Title

97 River Road
Address

Bow | NH | 03304
Town/City | State | Zip Code

224-4081 xt.247
Telephone Number

royrr@nu.com
E-mail Address

2. Application Preparation:

Public Service Company of NH
Company

Laurel L. Brown
Contact Person

780 North Commercial Street
Address

Manchester | NH | 03101
Town/City | State | Zip Code

603.634.2331
Telephone Number

brownll@nu.com
E-mail Address

Form ARD-1

3. Legal Contact:

Linda T. Landis
Contact Person

Senior Counsel
Title

780 North Commercial Street
Address

Manchester NH 03101
Town/City State Zip Code

603.634.2700
Telephone Number

landilt@nu.com
E-mail Address

4. Invoicing Contact:

Laurel L. Brown
Contact Person

Senior Environmental Analyst
Title

780 North Commercial Street
Address

Manchester NH 03101
Town/City State Zip Code

603.634.2331
Telephone Number

brownll@nu.com
E-mail Address

H. Major Activity or Product Descriptions - *List all activities performed at this facility and provide SIC code(s):*

Description of Activity or Product	SIC Code
Energy conversion facility producing electricity	4911

I. Other Sources or Devices - *List sources or devices at the facility (other than those that are the subject of this application) that are permitted pursuant to Env-A 600:*

Source or Device	Permit #	Expiration Date[1]
Electric Generating Unit #1	FP-T-0054	12/31/01
Electric Generating Unit #2	TP-B-0462	1/31/01
Combustion Turbine #1	PO-B-34	6/30/03
Combustion Turbine #2	PO-B-35	6/30/03
Emergency Generator	PO-B-1788	4/30/03
Emergency Boiler	TP-B-0490	9/30/04
Coal Crusher	PO-B-2416	4/30/03
Secondary Coal Crusher	PO-B-2417	4/30/03

II. Total Facility Emissions Data[2]:

Pollutant	CAS Number	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	165.60	1,150.14	611.32	5,042.90
SO_2	N/A	8,778.89	25,885.80	32,726.62	113,249.00
NOx	N/A	1,456.10	3,012.92	4,963.95	10,746.50
CO	N/A	84.52	126.38	314.37	638.79
VOC	N/A	18.42	31.30	69.13	161.51

Note: For Regulated Toxic Air Pollutants list name and Chemical Abstract Service Number (CAS #).

[1] Application Shield is in effect.

[2] Actual emissions calculated using calendar year 2006 emissions and hours of operation as reported April 15, 2007. Potential emissions calculated using maximum operational and emissions limitations contained in current permits issued by NH DES ARD. See attached calculations.

Form ARD-1

III. Support Data[3] *The following data must be submitted with this application:*

- ☒ A copy of all calculations used in determining emissions;
- ☐ A copy of a USGS map section with the site location clearly indicated; and
- ☐ A to-scale site plan of the facility showing:
  1. the locations of all emission points;
  2. the dimensions of all buildings, including roof heights; and
  3. the facility's property boundary.

IV. Certification (To be completed by a responsible official only):

I am authorized to make this submission on behalf of the affected source or affected units for which this submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the information submitted in this document and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

I certify that Public Service Company of New Hampshire is the owner of the real property located at 97 River Road, Bow, New Hampshire, and that PSNH has the legal right to use said property for the construction and/or operation of a new FGD system at Merrimack Station.

Print/Type Name: John M. MacDonald Title: Vice President — Energy Delivery & Generation

Signed: _____ Date: December 10, 2008

[3] A copy of a USGS map and to-scale site plan will be included in the results of the air pollution dispersion modeling impact analysis.

Form ARD-1

II. Total Facility Emissions Data[4]:

Pollutant	CAS Number	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	168.42	1,150.14	675.42	5,042.90
SO_2	N/A	9,481.53	25,885.80	36,485.49	113,249.00
NOx	N/A	1,193.57	3,012.92	3,223.86	10,746.50
CO	N/A	84.28	126.38	321.57	638.79
VOC	N/A	18.95	31.30	70.75	161.51

Note: For Regulated Toxic Air Pollutants list name and Chemical Abstract Service Number (CAS #).

[4] Actual emissions calculated using calendar year 2007 emissions and hours of operation as reported April 15, 2008. Potential emissions calculated using maximum operational and emissions limitations contained in current permits issued by NH DES ARD. See attached calculations.

PSNH MK Station Emissions Summary

2006

Actual Emissions

	SO2 lb/hr	SO2 tpy	NOx lb/hr	NOx tpy	PM lb/hr	PM tpy	CO lb/hr	CO tpy	VOCs lb/hr	VOCs tpy	Operating Hours
MK1	2,738.73	9,998.00	454.17	1,658.00	96.19	351.14	21.88	79.89	4.81	17.56	7,301.19
MK2	5,998.86	22,728.00	872.06	3,304.00	68.67	260.17	61.89	234.47	13.61	51.57	7,577.44
CT1	26.12	0.35	82.09	1.10	0.75	0.01	0.75	0.01	-	-	26.80
CT2	15.18	0.27	47.78	0.85	-	-	-	-	-	-	35.58
EG	-	-	-	-	-	-	-	-	-	-	14.00
EB	-	-	-	-	-	-	-	-	-	-	-
	8,778.89	32,726.62	1,456.10	4,963.95	165.60	611.32	84.52	314.37	18.42	69.13	

Actual Facility Total

SO2 lb/hr	SO2 tpy	NOx lb/hr	NOx tpy	PM lb/hr	PM tpy	CO lb/hr	CO tpy	VOCs lb/hr	VOCs tpy
8,778.89	32,726.62	1,456.10	4,963.95	165.60	611.32	84.52	314.37	18.42	69.13

2007

Actual Emissions

	SO2 lb/hr	SO2 tpy	NOx lb/hr	NOx tpy	PM lb/hr	PM tpy	CO lb/hr	CO tpy	VOCs lb/hr	VOCs tpy	Operating Hours
MK1	2,675.90	11,420.00	227.40	970.50	96.11	410.16	21.87	93.35	4.81	20.54	8,535.45
MK2	6,704.20	25,064.00	601.30	2,248.00	70.95	265.24	61.04	228.20	13.43	50.20	7,477.10
CT1	50.02	0.77	179.93	2.77	0.65	0.01	0.65	0.01	-	-	30.79
CT2	51.41	0.72	184.93	2.59	0.71	0.01	0.71	0.01	0.71	0.01	28.01
EG	-	-	-	-	-	-	-	-	-	-	16.89
EB	-	-	-	-	-	-	-	-	-	-	-
	9,481.53	36,485.49	1,193.57	3,223.86	168.42	675.42	84.28	321.57	18.95	70.75	

Actual Facility Total

SO2 lb/hr	SO2 tpy	NOx lb/hr	NOx tpy	PM lb/hr	PM tpy	CO lb/hr	CO tpy	VOCs lb/hr	VOCs tpy
9,481.53	36,485.49	1,193.57	3,223.86	168.42	675.42	84.28	321.57	18.95	70.75

PSNH MK Station
Emissions Calculations

SO2	Permit Limit Max Sulfur Content	Equivalent % Sulfur	Permit Limit Max Coal TPY	AP42 Actual lb/ton	Permit Limit Max Coal Ton/Hr	Calculated Potential TPY	Calculated Potential Lbs/Hr
MK1	2.8	3.645	425,289	38(s)	48.5	29,453	6,725
MK2	2.8	3.645	1,193,078	38(s)	136.2	82,627	18,865

Equation:	TPY = AP42 factor x % sulfur x max tons of coal / 2000					
MK1	38(s)	3.645	425,289	/ 2000	=	29,453
MK2	38(s)	3.645	1,193,078	/ 2000	=	82,627

Equation:	Lb/Hr = TPY / 8760				
MK1	29,453	x 2000	/ 8760	=	6,725
MK2	82,627	x 2000	/ 8760	=	18,865

CO	Permit Limit Max Coal TPY	CO AP42 lb/ton	Permit Limit Max Coal Ton/Hr	Calculated Potential Lb/Hr	Calculated Potential TPY
MK1	425,289	0.5	48.50	24.25	106.32
MK2	1,193,078	0.5	136.20	68.10	298.27

Equation:	TPY = AP42 factor x max tons of coal / 2000				
MK1	0.5	425,289	/ 2000	=	106.32
MK2	0.5	1,193,078	/ 2000	=	298.27

Equation:	Lb/Hr = AP42 factor x max tons of coal			
MK1	0.5	48.50	=	24.25
MK2	0.5	136.20	=	68.10

PM	Permit Limit Max. TPY	Permit Limit Max. lb/mmBtu	Permit Limit Max Heat Input mmBtu/hr	Calculated Potential Lb/Hr
MK1	1,463	0.227	1238	281.03
MK2	3,459	0.27	3473	937.71

Equation:	Lb/Hr = max lb/mmBtu x max heat input			
MK1	0.227	1,238	=	281.03
MK2	0.27	3,473	=	937.71

VOCs	Permit Limit Max Coal TPY	AP42 lb/ton	Permit Limit Max Coal Ton/Hr	Calculated Potential Lb/Hr	Calculated Potential TPY
MK1	425,289	0.11	48.50	5.34	23.39
MK2	1,193,078	0.11	136.20	14.98	65.62

Equation:	TPY = AP42 factor x max tons of coal / 2000				
MK1	0.11	425,289	/2000	=	23.39
MK2	0.11	1,193,078	/2000	=	65.62

Equation:	Lb/Hr = AP42 factor x max tons of coal			
MK1	0.11	48.50	=	5.34
MK2	0.11	136.20	=	14.98

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Unit #1 – Steam Electric Boiler
Date Construction Commenced: _____ **Device Start-Up Date:** 1960

A. Boiler ☐ Not Applicable

Babcock & Wilcox — Boiler Manufacturer
RB-337 — Boiler Model Number
N/A — Boiler Serial Number
1072 — Gross Heat Input Nameplate Rating (MMBtu/hr)
N/A — Burner Manufacturer
N/A — Burner Model Number
N/A — Burner Serial Number
N/A — Potential Fuel Flow Rate
☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:
- ☒ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☒ Fly Ash Re-injection
- ☐ Other (specify): _____

b. Liquid Fuel:
- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): _____

c. Gaseous Fuel:
- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): _____

2. Combustion Type:
- ☐ Tangential Firing
- ☐ Opposite End Firing
- ☐ Limited Excess Firing
- ☐ Flue Gas Recirculation
- ☐ Staged Combustion
- ☐ Biased Firing
- ☒ One End Only Firing
- ☐ Other (specify): _____

B. Internal Combustion Engines/Combustion Turbines ☒ Not Applicable

Manufacturer
Model Number
☐ gal/hr ☐ mmcf/hr
Serial Number
Fuel Flow Rate
☐ hp ☐ kW
Engine Output Rating
Reason for Engine Use

C. Stack Information

Is unit equipped with multiple stacks? ☒ Yes1 ☐ No *(if yes, provide data for each stack)*

Identify other devices on this stack: Primary Stack: MK Unit #2; Secondary Stack: none

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☒ Yes ☐ No

If yes, Describe: Opacity, SO_2, NOx, CO_2, Flow

Is stack capped or otherwise restricted? ☐ Yes ☒ No

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

Primary: 21.2 Alternate: 14.5 Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2)	Primary: 445 Alternate: 317 Discharge height above ground level (ft)
Primary: 1,362,620 Alternate: 1,200,000 Exhaust Flow (acfm)	N/A Exhaust Velocity (ft/sec)
Primary: 130.8 °F Alternate: 335 °F Exhaust Temperature (°F)	

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Varies
Supplier's Name

Street

Town/City State Zip Code

Telephone Number

2. Fuel Additives:

N/A
Manufacturer's Name

Street

Town/City State Zip Code

Telephone Number

Identification of Additive

Consumption Rate (gallons per 1000 gallons of fuel)

3. Fuel Information[2] *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input[3] (MMBtu/hr)	Actual Annual Usage[4] (specify units)
Coal	1.7	7.3	6.4	13,864 Btu/lb	1,238	319,301 tons
#2 Oil	0.01	N/A	N/A	136,239 Btu/gal	1,238	25,927 gallons

[1] Unit #1 will employ the new FGD chimney as its primary stack and the existing Unit #2 stack as secondary stack during Unit #2 and FGD planned maintenance overhauls.
[2] Fuel information: Quarterly average, monthly composite samples, as determined. Source: MK_LAB/FuelAnalysis.xls
[3] Heat input of Unit #1 as specified in permit.
[4] Actual annual usage based on calendar year 2006 fuel usage as reported April 15, 2007.

B. Hours of Operation

Hours per day: 24 Days per year: 365

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

- ☐ baffled settling chamber
- ☐ long cone cyclone
- ☐ multiple cyclone (inch diameter)
- ☒ electrostatic precipitator (two ESPs in series)
- ☐ spray tower
- ☐ venturi scrubber
- ☐ afterburners (incineration)
- ☒ selective catalytic reduction (SCR)
- ☐ reburn
- ☐ wide bodied cyclone
- ☐ irrigated long cone cyclone
- ☐ carbon absorption
- ☐ irrigated electrostatic precipitator
- ☐ absorption tower
- ☐ baghouse
- ☐ packed tower/column
- ☐ selective non-catalytic reduction
- ☒ other: flue gas desulfurization (FGD) system

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	N/A	N/A	N/A	N/A
SO_2	N/A	N/A	N/A	N/A	N/A
NOx	N/A	N/A	N/A	N/A	N/A
CO	N/A	N/A	N/A	N/A	N/A
VOC	N/A	N/A	N/A	N/A	N/A

Method used to determine entering emissions: N/A

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other (specify):

C. Operating Data

1. Expected ESP Efficiency: > 90 % Verified by: ☐ test ☐ calculations
2. Expected SCR Efficiency: > 85 % Verified by: ☐ test ☐ calculations
3. Expected FGD Efficiency: > 90 % SO2; > 80% Hg Verified by: ☐ test ☐ calculations
4. Normal Operating Conditions *(supply the following data as applicable)*

N/A Total gas volume through unit (acfm)	N/A Temperature (°F)	N/A Percent Carbon Dioxide (CO_2)
N/A Voltage	N/A Spark Rate	N/A Milliamps
N/A Pressure Drop (inches of water)	N/A Liquid Recycle Rate (gallons per minute)	

Form ARD-2

IV. DEVICE EMISSIONS DATA[5]:

2006 Emissions

Pollutant	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM	96.2	334.04	351.1	1,463.1
SO_2	2,738.7	6,724.4	9,998.0	29,453.0
NOx	454.2	1,508.3	1,658.0	6,606.5
CO	21.9	24.25	79.9	106.32
VOCs	4.8	5.34	17.5	23.39

2007 Emissions

Pollutant	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM	96.1	334.04	410.2	1,463.1
SO_2	2,675.9	6,724.4	11,420.0	29,453.0
NOx	227.4	1,508.3	970.5	6,606.5
CO	21.9	24.25	93.4	106.32
VOCs	4.8	5.34	20.5	23.39

Method used to determine exiting emissions:

☒ stack test ☒ vendor data ☒ emission factor ☐ material balance

☒ other (specify): Continuous Emissions Monitoring System (CEMS)

[5] Actual emissions calculated using emissions and hours of operation contained in annual emissions reports. Potential emissions calculated using maximum operational and emissions limitations contained in current permits issued by NH DES ARD.

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Unit #2 – Steam Electric Boiler
Date Construction Commenced: _____ **Device Start-Up Date:** 1968

A. Boiler ☐ Not Applicable

Babcock & Wilcox — Boiler Manufacturer
UP-42 — Boiler Model Number
N/A — Boiler Serial Number
3015 — Gross Heat Input Nameplate Rating (MMBtu/hr)
N/A — Burner Manufacturer
N/A — Burner Model Number
N/A — Burner Serial Number
N/A — Potential Fuel Flow Rate
☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:
- ☒ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☒ Fly Ash Re-injection
- ☐ Other (specify): _____

b. Liquid Fuel:
- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): _____

c. Gaseous Fuel:
- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): _____

2. Combustion Type:
- ☐ Tangential Firing
- ☒ Opposite End Firing
- ☐ Limited Excess Firing
- ☒ Flue Gas Recirculation
- ☐ Staged Combustion
- ☐ Biased Firing
- ☐ One End Only Firing
- ☐ Other (specify): _____

B. Internal Combustion Engines/Combustion Turbines ☒ Not Applicable

Manufacturer
Model Number
☐ gal/hr ☐ mmcf/hr
Serial Number
Fuel Flow Rate
☐ hp ☐ kW
Engine Output Rating
Reason for Engine Use

C. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: MK Unit #1

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☒ Yes ☐ No

If yes, Describe: Opacity, SO_2, NOx, CO_2, Flow,

Is stack capped or otherwise restricted? ☐ Yes ☒ No

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

21.2
Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2)

445
Discharge height above ground level (ft)

1,362,620
Exhaust Flow (acfm)

N/A
Exhaust Velocity (ft/sec)

130.8 °F
Exhaust Temperature (°F)

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Varies
Supplier's Name

Street

Town/City State Zip Code

Telephone Number

2. Fuel Additives:

N/A
Manufacturer's Name

Street

Town/City State Zip Code

Telephone Number

Identification of Additive

Consumption Rate (gallons per 1000 gallons of fuel)

3. Fuel Information[1] *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input[2] (MMBtu/hr)	Actual Annual Usage[3] (specify units)
Coal	1.6	7.6	6.4	13,679 Btu/lb	3,473	937,595 tons
#2 Oil	0.01	N/A	N/A	136,239 Btu/gal	3,473	29,070 gallons

[1] Fuel information: Quarterly average, monthly composite samples, as determined. Source: MK_LAB/FuelAnalysis.xls.
[2] Heat input of Unit #1 as specified in permit.
[3] Actual annual usage based on calendar year 2006 fuel usage as reported April 15, 2007.

Form ARD-2

B. Hours of Operation

Hours per day: 24 Days per year: 365

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

- ☐ baffled settling chamber
- ☐ long cone cyclone
- ☐ multiple cyclone (inch diameter)
- ☒ electrostatic precipitator (two ESPs in series)
- ☐ spray tower
- ☐ venturi scrubber
- ☐ afterburners (incineration)
- ☒ selective catalytic reduction (SCR)
- ☐ reburn
- ☐ wide bodied cyclone
- ☐ irrigated long cone cyclone
- ☐ carbon absorption
- ☐ irrigated electrostatic precipitator
- ☐ absorption tower
- ☐ baghouse
- ☐ packed tower/column
- ☐ selective non-catalytic reduction
- ☒ other: flue gas desulfurization(FGD) system

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM / PM10	N/A	N/A	N/A	N/A	N/A
SO_2	N/A	N/A	N/A	N/A	N/A
NOx	N/A	N/A	N/A	N/A	N/A
CO	N/A	N/A	N/A	N/A	N/A
VOC	N/A	N/A	N/A	N/A	N/A

Method used to determine entering emissions: N/A

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other (specify):

C. Operating Data

1. Expected ESP Efficiency: > 90 % Verified by: ☐ test ☐ calculations
2. Expected SCR Efficiency: > 85 % Verified by: ☐ test ☐ calculations
3. Expected FGD Efficiency: > 90 % SO2; > 80% Hg Verified by: ☐ test ☐ calculations

4. Normal Operating Conditions *(supply the following data as applicable)*

Total gas volume through unit (acfm)	Temperature (°F)	N/A Percent Carbon Dioxide (CO_2)
N/A Voltage	N/A Spark Rate	N/A Milliamps
N/A Pressure Drop (inches of water)	N/A Liquid Recycle Rate (gallons per minute)	

IV. DEVICE EMISSIONS DATA[4]:

2006 Emissions

Pollutant	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM	68.7	789.6	260.2	3,458.6
SO_2	5,998.9	18,864.6	22,728.0	82,627.0
NOx	872.1	1,283.3	3,304.0	5,621.0
CO	61.9	68.1	234.5	298.3
VOCs	13.6	15.0	51.6	65.6

2007 Emissions

Pollutant	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM	71.0	789.6	265.3	3,458.6
SO_2	6,704.2	18,864.6	25,064.0	82,627.0
NOx	601.3	1,283.3	2,248.0	5,621.0
CO	61.0	68.1	228.2	298.3
VOCs	13.4	15.0	50.2	65.6

Method used to determine exiting emissions:

☒ stack test ☒ vendor data ☒ emission factor ☐ material balance

☒ other (specify): Continuous Emissions Monitoring System (CEMS)

[4] Actual emissions calculated using emissions and hours of operation contained in annual emissions reports. Potential emissions calculated using maximum operational and emissions limitations contained in current permits issued by NH DES ARD.

PSNH Merrimack Station

Table 1 Significant Activity Identification			
Emission Unit Number	Emission Unit	Maximum Gross Heat Input Rate or Maximum Power Output	Maximum Operating Conditions
MK1	Utility Boiler (Installed in 1960)	1,238 mmBtu/hr 113.5 MW	48.5 tons/hr bituminous coal, not to exceed 425,289 tons during any consecutive 12 month period, the sulfur content of coal shall not exceed 2.8 lb mmBtu and 2.0 lb/mmBtu gross heat content averaged over any consecutive 3 month period; maximum No. 2 fuel oil consumption of 1,656 gal/hr, not to exceed 14.5 million gallons during any consecutive 12 month period
MK2	Utility Boiler (Installed in 1968)	3,473 mmBtu/hr 320 MW	136.2 tons/hr bituminous coal, not to exceed 1,193,078 tons during any consecutive 12 month period, the sulfur content of coal shall not exceed 2.8 lb/mmBtu gross heat content and 2.0 lb/mmBtu gross heat content averaged over any consecutive 3 month period; maximum No. 2 fuel oil consumption of 1,656 gal/hr, not to exceed 14.5 million gallons during any consecutive 12 month period
MKCT1	Combustion Turbine #1 (Installed in 1968)	319 mmBtu/hr 30,172.5 Hp	2,279 gal/hr No. 1 fuel oil or JP-4 with a maximum sulfur content of 0.4% sulfur by weight (assuming 140,000 Btu/gal)
MKCT2	Combustion Turbine #2 (Installed in 1969)	319 mmBtu/hr 29,636.1 Hp	2,279 gal/hr No. 1 fuel oil or JP-4 with a maximum sulfur content of 0.4% sulfur by weight (assuming 140,000 Btu/gal)
CHS	Coal Handling System (Installed in 1960)	N/A	Primary Coal Crusher: Maximum of 885 ton/hr coal; Secondary Coal Crusher: Maximum of 690 ton/hr coal
MKEG	Emergency Generator (Installed in 1988)	3.932 mmBtu/hr 534 HP	28.7 gal/hr of No. 2 fuel oil at 0.4% sulfur by weight or less (assuming 137,000 Btu/gal)
MKEB	Emergency Boiler	96 mmBtu/hr	Hourly maximum fuel use limit of 520 gal/hr and daily fuel use limit of 11,760 gal/day of No. 2 fuel oil (maximum sulfur content of 0.4% sulfur by weight) OR hourly maximum fuel use of 701 gal/hr on-road low sulfur diesel oil (maximum sulfur content of 0.05% sulfur by weight)

Table 5 – Summary of Emissions Limitations				
Pollutant	MK1	MK2	MKCT1 or MKCT2	MKEB
NH3	10 ppmdv at 3% oxygen	10 ppmdv at 3% oxygen	NA	NA
SO_2	NA	NA	128.9 lb/hr and 564.5 tons during any consecutive 12-month period	38.96 lb/hr and 40.0 tons per consecutive 12-month period
NOx	0.92 lb/mmBtu based on a 24-hour calendar day average	0.86 lb/mmBtu based on an annual average and 15.4 tons NOx per 24-hour calendar day	0.90 lb/mmBtu	13.72 lb/hr and 25.0 tons per consecutive 12-month period
CO	NA	NA	67.1 tons during any consecutive 12-month period	3.43 lb/hr and 100.0 tons per consecutive 12-month period
TSP/PM10	0.27 lbTSP/mmBtu and 1,463.1 tons per consecutive 12-month period	0.227 lbTSP/mmBtu and 3,458.6 tons per consecutive 12-month period	53.1 tons TSP per consecutive 12-month period	2.26 lb/hr PM10 and 15.0 tons PM10 per consecutive 12-month period
VOCs		NA	23.75 tons per consecutive 12-month period	0.14 lb/hr and 25.0 tons per consecutive 12-month period